

ABSTRACT

A method for improving the pumping performance of an electrokinetic pump. The addition of zwitterions to the pump fluid or electrolyte of an electrokinetic pump (EKP) has been found to improve the pumping performance by increasing the maximum pressure and flow rate generated and increasing the efficiency for a given applied voltage. Zwitterions comprise a class of molecules that contain separated positive and negative charge centers within the molecule, are substantially electrically neutral, and generally exhibit a large inherent dipole moment ($\approx 20-25$ D) as a consequence of charge separation within the structure of the molecule. The addition of the zwitterion trimethyl ammonium propane sulfonate to an EKP electrolyte has resulted in a 3-fold increase in pump efficiency and a 2.5-fold increase in generated pressure for a given applied voltage.